
XV. *Remarks on the Generic Characters of Mosses, and particularly of the Genus Mnium.*

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AMONG all the different botanical opinions concerning the genera of Mosses, to which the discoveries of the great Hedwig have given birth, nothing has been more variously characterized, nor less accurately defined, than the old genus of *Mnium*, first established by Dillenius. The wanderings of the human mind in pursuit of truth are amusing and instructive, let the subject of its speculations be what it will; in natural science especially they always lead to good. That wisdom so conspicuous to the most careless observer of creation at large, condescends to display itself with more effect and precision in proportion to the ardour and accuracy of our inquiries; and the humblest moss affords no less instruction to the philosophical student of order, than satisfaction to the pious mind. Our time therefore may not be ill bestowed in examining, first, the principles upon which Dillenius founded this genus, and then in considering how those principles, with other new ones discovered since, have led his successors widely astray in various directions, till we shall find the judgment of Dillenius confirmed, though upon principles to which he was a stranger.

This accurate observer of Mosses gives, as the character of his
Mnium,

Mnium, that it bears two different kinds of heads, or fructification; the one powdery and naked, that is, destitute of calyx and capsule; the other of the same capsular nature as in *Bryum* and *Hypnum*, those great genera which, in the work of Dillenius, swallow up almost all the rest of this natural order. He considers this character as abundantly sufficient to distinguish *Mnium* from all other mosses, and proceeds to inquire into the nature of these different parts of fructification. He presumes the capsules to be, as he believed of other mosses, *antheræ*, and the powdery heads to produce seeds, or at least what is analogous to them. We now know that he mistook the male for the female, and *vice versa*; though his having called the supposed *antheræ* by the name of *capsulæ* has concealed his mistake from common observation, and thrown all the glare of his error on Linnæus, who adopting his hypothesis, at the same time corrected, as he thought, his phraseology. We now resume the language though we discard the ideas of Dillenius, calling his and Linnæus's supposed *antheræ* by their proper name of *capsulæ*. Nor, while we profit of the brilliant physiological and botanical discoveries of Micheli and Hedwig, do we find any reason to follow the former in his careless denomination of the part in question, which he calls *capitulum*, nor to adopt the new word invented by the latter, without any reason or advantage, *sporangium*.

Dillenius describes eight supposed species of *Mnium*; for he has referred to this genus every thing in which he found a powdery head, even though he did not meet with the capsule. This has led him into a great error. In his first, second, third, fourth and eighth species he is indeed, as far as any one could at that time be, correct; but his remaining species are not even mosses at all. The fifth and sixth are *Jungermaniæ*, a mistake which Linnæus did not correct; and the seventh is, as the careful Micheli had already

already made it, a most distinct genus of *Algæ*, the *Blasia pusilla* of himself and Linnæus.

Linnæus, in just conformity to the principle he had adopted, referred to *Mnium* every moss with a terminal fruit-stalk, in which the powdery head or star of male flowers, supposed by him female, had been found; but this tended in no small degree to perplex his followers. Some of them indeed, chiefly intent on compiling catalogues, and having an implicit confidence in their master, never disputed the genus of any plant which he had fixed. The homage of such pupils, however, could not conduce much to his honour; for such imperfect observers could be no adequate judges of his merit. His own talents were formed in the school of severe investigation and accurate discrimination, and those only can appreciate them who have been trained under the same wholesome discipline. These powdery heads or stars were found to exist, in some shape or other, in many supposed species of *Bryum* when carefully examined; and at length the Hedwigian discoveries have, beyond a doubt, demonstrated them to be the male flowers,—consequently essential to every moss. For some years therefore, during the progress of these discoveries, botanists were at perpetual variance concerning the genera of many common mosses, which were by some writers referred to *Bryum*, by others to *Mnium*, according as the male flower was observed or not. It is but justice to the author of the *Flora Anglica* to remark, that, even in his first edition, he steered clear of this difficulty, by referring to *Mnium* such only as have a *naked* head of male flowers; by which, except the original Dillenian blunder respecting 2 or 3 *Jungermanniæ*, he has pretty nearly preserved the natural genus entire. Lightfoot on the other hand, in his *Flora Scotica*, has indolently followed Linnæus. Withering, so careful and attentive in some departments of the *Cryptogamia*, has in this
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most unaccountably failed. It is difficult to understand his definitions of the two generic characters, and next to impossible to divine by what rule he distributed the species under each.

From the Hedwigian school, which had thrown so much light on the generic characters of mosses in general, and which had done the most essential service in removing from *Mnium* and *Bryum* those vast and discordant tribes in which the *peristomium* is simple, every thing was to be expected upon the point in question. For my own part, after having contemplated with rapturous admiration the physiological discoveries of the illustrious Hedwig, and yielded that implicit assent to his assertions and deductions, which his clear and candid manner commands, I turned with eagerness to the methodical part of his works. My primary object was to learn to distinguish with certainty the genera of *Hypnum*, *Bryum* and *Mnium*, about which botanists had ever been in dispute. But here I was disappointed. In his distribution of the mosses with a single *peristomium* all is lucid order, so far at least as his principles are admissible. In the arrangement of those which have an inner *peristomium*, he appears to me to run into refinements which neither lead to the knowledge of natural genera, nor can easily be followed up by common observers. I found with some concern that we must rely on the old mode of distinguishing *Hypnum*, by its lateral fruit-stalk, from *Bryum*, the difficulties attending which are however happily removed by the separation of the single-fringed mosses from the latter: I found moreover that *Mnium* remained at least as unintelligible as before. Indeed Hedwig has rather confused it by reversing the original characters. His *Bryum* has a round or capitate male flower; his *Mnium* a flat or discoid one. His most able followers, Schreber, Swartz and Roth, well aware of the insufficiency of such distinctions, united the two genera into one,

while Hoffman made a bold but unsuccessful attempt to cut the gordian knot, by calling almost every thing with a single *peristomium Bryum*, and with a double one *Mnium*.

In solving this and every other botanical difficulty of the kind, the surest guide is that golden rule of Linnæus, "*Genus dabit characterem, non character genus.*" By this touch-stone let us presume to try the genera of Hedwig, but with all the deference due to so great a master. If my corrections should prove just, truth may be benefited, but his immortal fame cannot be impaired. No one would be more eager than myself to defend it, if necessary, against any carping censors.

The great hinges on which his method turns are the double, the single, and the defective *peristomium*, and the terminal or lateral situations of the male and female flowers. Of these the three first have the felicity, rare in botanical characters, of being absolute, and leading, with almost mathematical precision, to natural genera. *Orthotrichum* only affords some exceptions. Of some of the Hedwigian subdivisions of these, different opinions may be formed, though there can be but one sentiment concerning the great outline. For instance, the comparative number of teeth, in the simple *peristomium*, 4, 8, 16, 32 or 64, affords most solid generic distinctions, and I regret that, in forming his genus of *Didymodon*, he makes number subservient to a trivial and very obscure circumstance, the approximation of the teeth in pairs. I scruple not to refer his *Didymodon homomallum*, in the description of which he omits to notice that it has but 16 teeth, to *Grimmia*, and the other species to *Trichostomum*. So all the species of *Cynodontium*, a genus distinguished from *Didymodon* by the flowers being hermaphrodite only, may be very commodiously referred either to *Grimmia* or *Trichostomum*, according as the teeth are 16 or 32. And here I beg leave to observe, that this circumstance
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of hermaphrodite flowers appears to my judgment the least solid of all the Hedwigian distinctions, and leading in no case to a natural, still less a commodious, generic character. With *Cynodontium* therefore I scruple not to abolish *Webera* and *Pohlia*; nor should I retain *Bartramia*, but for its peculiar habit, and an easy essential character to be mentioned hereafter. But while I thus venture to prune this ingenious system, let me indulge in the applause it deserves for the excellent marks it affords in *Tetraphis*, *Dicranum*, *Tortula*, *Polytrichum* and *Fontinalis*, which alone are enough to ensure its permanency as long as the study of botany endures.

We come now to the investigation of what makes but too conspicuous a figure in this admirable system, the situation of the male and female flowers. I mean not to object to the characters deduced from the latter. Experience shows that the female flowers being lateral or terminal is of primary if not infallible importance in this tribe. The most natural genera of *Bryum* and *Hypnum*, and the no less natural *Pterogonium*, cannot be defined by any other means. In these cases, "*genus dat characterem*." What I regret is, that Hedwig, carrying this principle through with the male flowers also, has made the *character give the genus*, and in every case, but perhaps one, erroneously. Thus *Fissidens* is separated from *Dicranum*, and *Weissia* from *Grimmia*, with some reason indeed, as to habit, in some species of each, but not in all*; and *Barbula* is divided from *Tortula* against every natural principle. It becomes me however to mention the one case in which I have been almost tempted to admit the character of the male flower being axillary instead of terminal to mark a genus, which is in *Gymnostomum*. The habit of *Anictangium*, the original *Hedwigia*, is so distinct from the other naked-mouthed

* In some species of *Fissidens* the female flower indeed is lateral.

mosses, as almost to authorize a separation*; and I am inclined to regret that this greatest name in mosses has been removed to a distant tribe of plants, with which it has no peculiar associability.

Let me now draw this subject to a conclusion by suggesting a mark, which, I presume, may serve to distinguish some genera in which the Hedwigan characters are least satisfactory, I mean *the capsule being longitudinally furrowed*. I have long ago indicated this character in *English Botany*, under *Bartramia*, but have not till lately adverted to it in *Mnium*; I am however persuaded that it is equally certain in both. It is chiefly seen in the ripe fruit, and the number of furrows is 16, answerable to the teeth of the outer fringe. It keeps the real *Mnia* of Dillenius together, except the first, which is the *Tetraphis pellucida*, and it associates with them most naturally the *Arrhenopterum* of Hedwig. Having examined every *Bryum* which has come in my way, I can aver that a smooth capsule is essential to that genus. The same may almost be said of *Hypnum*; for I know no described species with a furrowed capsule except the *undulatum*, and perhaps the *ornithopodioides*. I have indeed lately received a number of exotic mosses with furrowed capsules from my worthy friend Mr. Menzies. These will probably come under *Mnium*; but it requires more time than I can just now bestow, to examine accurately the terminal or lateral origin of all their fruit-stalks. I am ready to allow that this character of the furrowed capsule, which appears so sufficient to characterize a genus, already indicated by its habit, in double-fringed mosses, is, in those with a single fringe, of no further importance than to distinguish species. Who does not know that the most essential principles of generic distinction, the germen inferior or superior for instance, are sometimes of no validity at all?

* Mr. D. Turner has just suggested to me that the *female* flowers in several *Anictangia* are lateral; which is a sufficient mark.

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Witness the most natural genus of *Saxifraga*. On the other hand, what slight marks are we glad to seize, in the grasses and umbelliferous plants, to mark genera which habit shows to be distinct!

As the *furrowed spherical capsule* of *Bartramia* therefore with ease reduces to that genus the *Mnium chrysocomum* of Dickson, as well as the *fontanum* and *marchicum* of Hedwig, which Nature indicates as belonging to it, and possibly his *sphærocarpon* also, though I have not seen the latter; so the *furrowed cylindrical capsule* of *Mnium* will, unless I am greatly mistaken, bring together species closely allied to each other, and on many accounts unlike other mosses. If the cylindrical or spherical capsule be thought too slight a distinction, these two genera must be united under *Mnium*, that being the oldest name; but I should with difficulty assent to such an union.

I shall conclude with the generic character of *Mnium* at length, and an enumeration of all the species that I have been able to determine with certainty.

MNIUM.

Capsula cylindræa, mox sulcata. *Peristomium* exterius dentibus sedecim, basi dilatatis: *interius* membranaceum, laciniatum. *Calyptra* lævis. *Pedicellus* terminalis.

1. MNIUM *androgynum*, monoicum, capsulâ rectâ operculo conico, foliis undique imbricato-patulis apice denticulatis.

M. androgynum. *Lim.*

Dill. t. 31. f. 1.

Habitat in Europâ.

2. MNIUM *conoideum*, monoicum? capsulâ obovatâ rectâ, operculo subulato, foliis undique imbricato-patulis integerrimis.

M. conoideum. *Engl. Bot. t. 1239.*

Bryum conoideum. Dicks. *Crypt. fusc.* 4. 9. t. 11. f. 2.

Habitat in Scotiâ et Hiberniâ.

5. *MNIUM palustre*, dioicum, capsulâ obliquâ, foliis acutis: superioribus arcuato-secundis, caule erecto dichotomo.

M. palustre. Linn.

Dill. t. 31. f. 3.

β. Dill. t. 31. f. 4.

Habitat in palustribus Europæ.

4. *MNIUM reclinatum*, dioicum, capsulâ erectiusculâ, operculo conico, foliis obtusiusculis subsecundis, caule decumbente ramosissimo.

M. ramis brevibus, inordinate progredientibus. Dill. Musc. 239. t. 31. f. 8. Herb. Dill.

In Virginia paludosis legit J. Mitchell. *Dill.*

Color et facies præcedentis, sed magnitudo totius plantæ duplò minor. Capsula gracilis, ferè erecta. Caulis ramosissimus, decumbens, nec dichotomus, erectus. Flores dioici, omnes terminales; masculi pedicellati, nudi, ut in *M. androgyno*, et *M. palustri β*.

5. *MNIUM pendulum*, capsulâ pendulâ, operculo planiusculo, foliis subulatis striatis recurvis, caule erecto.

In Novâ Zeelandiâ legit D. Menzies.

Caules determinatè ramosi, foliosi, ferrugineo-tomentosi. Folia lutescentia, undique imbricata, subulata, uninervia, striata, recurvato-subsecunda. Pedicelli solitarii, erecti, biunciales, rubri. Capsula recurvato-pendula, campanulato-cylindracea, castanea. Operculum planiusculum, umbonatum.

6. *MNIUM arrhenopterum*, capsulâ inclinâtâ, operculo subulato, foliis ellipticis obtusis, caule erecto.

Arrhe-

Arrhenopterum heterostichum. Hedw. *Sp. Musc.* 198. t. 46. f. 1—9.

Bryum heteropterum pellucidum. Dill. *Musc.* 352. t. 45. f. 11. minus bene. *Herb. Dill.*

B. foliis membranaceis obtusis. Dill. *Musc.* 552. t. 35. f. 19. meliùs. *Herb. Dill.*

B. caule erecto ramoso, foliis ovatis undique imbricatis. Linn. *Fl. Lapp. ed. 1.* 317. *Herb. Linn.*

Hypnum illecebrum. Linn. *Fl. Lapp. ed. 2.* 329. *Sp. Pl.* 1594, excluso syn. Dill.

Habitat in Virginiâ, Pensylvaniâ, etiam Lapponiâ.

I am obliged to Mr. Dawson Turner for the very interesting discovery of this being the same with the Lapland plant which Linnæus called *Hypnum illecebrum*. I had often examined the original specimen without any success; for, though it evidently appeared to be nothing known in Europe, I had not then seen the *Arrhenopterum*. I retain this generic name as an adjective for the specific denomination. Its only pretensions to be a genus consisted in the male flowers being axillary: and it furnishes an additional proof of how little importance that circumstance is in nature; for every thing clearly evinces the affinity of this moss to the original *Mnium*. The *Hypnum* n. 46. of Dillenius may therefore now retain the name of *illecebrum*, which was adopted from his definition of it in his work.